3. CALIFORNIA, OREGON, AND WASHINGTON

(1) The California-Oregon-Washington coast of the United States, between Mexico on the S and Canada's British Columbia on the N, is mostly rugged and mountainous, with high land rising abruptly from the sea in many places. S of San Francisco Bay the mountains are usually bare or covered with chaparral and underbrush. N of the bay the mountains are generally well timbered, and in some places, especially N of the Columbia River, the timber is particularly dense and heavy.

(2) **Disposal Sites** and **Dumping Grounds**.–These areas are rarely mentioned in the Coast Pilot, but are shown on the nautical charts. (See Disposal Sites and Dumping Grounds, chapter 1, and charts for limits.)

(3) **Aids to navigation.**–Lights are numerous along the coast; there are only a few places where a vessel is not in sight of one or more lights. Radiobeacons and fog signals are at most of the principal light stations. Marker radiobeacons, low-powered and for local use only, are at many small-craft harbors and at other points along the coast. Many coastal and harbor buoys are equipped with radar reflectors, which greatly increase the range at which the buoys may be detected. Loran coverage is good. The critical dangers are buoyed and are generally marked by kelp.

(4) There are many aerolights along the coast that are useful for navigation purposes, but they should not be confused with the marine lights. (See the Light List for a complete description of navigational aids.)

(5) **Electronic navigation.**–Radar, loran, and the radio direction finder have given the navigator means of determining his position in any weather. The mariner should, however, appreciate the limitations and sources of error of the various systems. Radar should be properly calibrated and tuned. Radio direction finders must be calibrated, and the operator should become experienced in the use of the equipment. Radar, radio direction finder, and loran equipment are subject to malfunctions which may not be immediately apparent to the operator, and there are conditions when loran or radio signals may be subject to error when the shipboard receiver is operating properly. Soundings should always be taken in critical places, and the position should be checked by visual bearings when possible.

(6) Radar navigation is facilitated along the Pacific coast by the generally high relief of the coastline. The rugged coast provides many points, headlands, and large offshore rocks which give accurate radar ranges and bearings. Radar ranges are more accurate than radar bearings. When two or more suitable targets can be positively identified, a better fix is obtained by radar ranges alone than by radar ranges and bearings. When visibility permits, visual bearings should always be taken. When positioning by a bearing and a radar range of a single object, the identification of the target must be positive. Floating aids to navigation should not be used as targets for fixing position.

(7) Radio direction finder equipment is subject to several kinds of errors. Bearings obtained at twilight or at night or bearings which are almost parallel to the coast should be accepted with reservations, due to "night effect" and to the distortion of the radio waves if traveling overland. Other sources of error in the system may be avoided by the proper calibration of the shipboard receiver.

(8) Loran provides good coverage along the Pacific coast.

(9) The frequent occurrence of fog along this coast makes radar an invaluable aid in detecting other traffic and obtaining a line of position and/or fix. Bridge-to-bridge radio communication (VHF-FM) is another useful aid, regardless of weather, in waters where maneuvering room is limited or restricted. The use of VHF-FM equipment for short-range communication is increasing, and so are the number of vessels equipped with this equipment. The primary advantages of this radio system are its line-of-sight characteristic and relative freedom from static interference.

(10) **COLREGS Demarcation Lines.**–Lines have been established to delineate those waters upon which mariners must comply with the International Regulations for Preventing Collisions at Sea, 1972 (72 COLREGS) and those waters upon which mariners must comply with the Inland Navigational Rules Act of 1980 (Inland Rules). The waters inside of the lines are **Inland Rules Waters,** and the waters outside of the lines are **COLREGS Waters.** (See **Part 80,** chapter 2, for specific lines of demarcation.)

(11) **Ports and Waterways Safety.–**(See **Part 160,** chapter 2, for regulations governing vessel operations and requirements for notification of arrivals, departures, hazardous conditions, and certain dangerous cargoes to the Captain of the Port.)

(12) **Channels.–Federal project depth** is the dredging depth of a channel as authorized by an Act of Congress upon recommendation of the Chief of Engineers, U.S. Army. **Controlling depth** in a channel is its least depth; it restricts use of the channel to drafts less than that depth.

(13) Where deepwater channels are maintained by the Corps of Engineers and the controlling depths are printed on the charts, the Coast Pilot usually gives only the project depth. Because of constant shoaling in places, depths may vary considerably between maintenance dredgings. (See Notice to Mariners and latest editions of charts for controlling depths.)

(14) Where secondary channels are maintained regularly by the Corps of Engineers, the Coast Pilot gives the controlling depths together with the dates of the latest surveys.

(15) In the case of other channels, the controlling depths printed in the Coast Pilot are from the latest available reports, which may, however, be several years old.

(16) **Depths alongside wharves.**–In general, depths given alongside wharves are those reported by owners and/or operators of the waterfront facilities, and have not been verified by government surveys. Since these depths may be subject to change, local authorities should be consulted for current controlling depths.

(17) Depths are in feet below the low-water tidal datum of the charts; deck heights where given are in feet above the chart datum for water depths.

(18) **Traffic Separation Schemes (Traffic Lanes)** have been established from the Gulf of Santa Catalina to the vicinity of Point Conception, off the entrance to San Francisco Bay, and in the Straits of Juan de Fuca and Georgia and Haro Straits. (See chapters 4, 7, and 12, respectively, for details.)

(19) **Vessel Traffic Services (VTS),** have been established in the San Francisco Bay area and in the Strait of Juan de Fuca, E of Port Angeles and in the waters of Rosario Strait, Admiralty Inlet, Puget Sound and the navigable waters adjacent to these areas. The services have been established to prevent collisions and groundings and to protect the navigable waters from environmental harm.

(20) The Vessel Traffic Services provide for a **Vessel Traffic Center (VTC)** that may regulate the routing and movement of vessels by radar surveillance, movement reports of vessels, VHF-FM radio communications, and specific reporting points. The systems consists of traffic lanes, separation zones, precautionary areas and reporting points.

(21) Participation in the **Vessel Traffic Service San Francisco** is mandatory for certain vessels within navigable waters of the United States, and voluntary west of the 3-mile boundary of the U.S. territorial sea. (See chapter 7, for details.) The Vessel Traffic Service in the Strait of Juan de Fuca, E of Port Angeles, and in the waters of Rosario Strait, Admiralty Inlet, and Puget Sound is mandatory. (See **161.1 through 161.60,** chapter 2, for rules governing vessel operations in the Vessel Traffic Service, and, chapter 12, for details.)

(22) **Offshore Vessel Movement Reporting System San Francisco** has been established in the ocean approaches to San Francisco. The system is voluntary. (See chapter 7 for details.)

(23) **Vessel Traffic Information Service Los Angeles/Long Beach** has been established for the approaches to Los Angeles and Long Beach. The Service is **voluntary.** (See chapter 4 for details.)

(24) **Drawbridges.**–The general regulations that apply to all drawbridges are given in **117.1 through 117.49,** chapter 2, and the specific regulations that apply only to certain drawbridges are given in **Part 117, Subpart B,** chapter 2. Where these regulations apply, references to them are made in the Coast Pilot under the name of the bridge or the waterway over which the bridge crosses.

(25) The drawbridge opening signals (see **117.15,** chapter 2) have been standardized for most drawbridges within the United States. The opening signals for those few bridges that are nonstandard are given in the specific drawbridge regulations. The specific regulations also address matters such as restricted operating hours and required advance notice for openings.

(26) The mariner should be acquainted with the general and specific regulations for drawbridges over waterways to be transited.

(27) **Depths** along most of the Pacific coast decrease much too rapidly from seaward to be of any practical use as an aid to navigation. The 100-fathom curve lies at an average distance of less than 10 miles from shore, but this distance is exceeded in the approaches to San Francisco Bay, Heceta Bank, Columbia River, and the Strait of Juan de Fuca.

(28) **Anchorages,** affording shelter for large vessels from the severe NW winds of summer, may be had in a number of places along the coast. In SE and SW weather there are few places where shelter is available; San Diego Bay, Los Angeles Harbor, the lee side of the Channel Islands, and Monterey Bay are the only places S of San Francisco Bay. N of San Francisco, good shelter is found in Humboldt Bay, Coos Bay, Columbia River, Willapa Bay, and Grays Harbor; but most of these places must be made before the sea rises, as afterward the bars become impassable. Neah Bay, just inside the entrance to the Strait of Juan de Fuca, is used considerably by small vessels in W or S weather. Many anchorages have been established in the area covered by this Coast Pilot. (See **Part 110,** chapter 2, for limits and regulations.)

(29) **Dangers.**–There are few outlying dangers, the principal ones being Bishop Rock, W of San Diego; Noonday Rock and the Farallon Islands, off San Francisco Bay; and Blunts, St. George, Rogue River, Orford, and Umatilla Reefs, N of San Francisco. The Channel Islands, off southern California, are the largest, most prominent, and the farthest offshore of any islands along the coast.

(30) **Oil well structures.**–Offshore drilling and exploration operations are increasing in the waters off California, especially in Santa Barbara Channel.

(31) Obstructions in these waters consist of submerged wells and oil well structures (platforms), including appurtenances thereto, such as mooring piles, anchor and mooring buoys, pipes, and stakes.

(32) In general, the oil well structures (platforms), depending on their size, depth of water in which located, proximity of vessel routes, nature and amount of vessel traffic, and the effect of background lighting, may be marked in one of the following ways:

(33) Quick flashing white light(s) visible at least 5 miles: fog signal sounded when visibility is less than 5 miles.

(34) Quick flashing white light(s) visible at least 3 miles: fog signal sounded when visibility is less than 3 miles.

(35) Quick flashing white or red lights visible at least 1 mile: may or may not be equipped with fog signal.

(36) Structures on or adjacent to the edges of navigable channels and fairways, regardless of location, may be required to display lights and fog signals for the safety of navigation.

(37) Associated structures within 100 yards of the main structure, regardless of location, are not normally lighted but are marked with red or white retro-reflective material. Mariners are cautioned that uncharted submerged pipelines and cables may exist in the vicinity of these structures, or between such structures and the shore.

(38) During construction of a well or during drilling operations, and until such time as the platform is capable of supporting the required aids, fixed white lights on the attending vessel or drilling rig may be shown in lieu of the required quick flashing lights on the structure. The attending vessel's foghorn may also be used as a substitute.

(39) Submerged wells may or may not be marked depending on their location and depth of water over them.

(40) All obstruction lights and fog signals, used to mark the various structures, are operated as privately maintained aids to navigation. (See **33 CFR 67,** for detailed regulations for the marking of offshore structures.)

(41) Information concerning the establishment, change, or discontinuance of offshore oil-well structures and their appurtenances is published in the Local Notice to Mariners or by Broadcast Notice. Additional information may also be obtained from the Coast Guard Commander. Mariners are advised to navigate with caution in the vicinity of these structures and in those waters where oil exploration is in progress, and to use the latest and largest scale chart of the area.

(42) During the continuing program of establishing, changing, and discontinuing oil-well structures, special caution should be exercised when navigating the inshore and offshore waters of the affected areas in order to avoid collision with any of the structures.

(43) Information concerning seismographic operations is not published in Notice to Mariners unless such operations create a menace to navigation in waters used by general navigation. Where seismographic operations are being conducted, casings (pipes), buoys, stakes, and detectors are installed. Casings are marked with flags by day and fixed red lights by night; buoys are

colored international orange and white horizontal bands; and stakes are marked with flags.

(44) **Pipelaying barges.**–With the increased number of pipeline laying operations, operators of all types of vessels should be aware of the dangers of passing close aboard, close ahead, or close astern of a jetbarge or pipelaying barge. Pipelaying barges and jetbarges usually move at 0.5 knot or less and have anchors which extend out about 3,500 to 5,000 feet in all directions and which may be marked by lighted anchor buoys. The exposed pipeline behind the pipelaying barge and the area in the vicinity of anchors are hazardous to navigation and should be avoided. The pipeline and anchor cables also represent a submerged hazard to navigation. It is suggested, if safe navigation permits, for all types of vessels to pass well ahead of the pipelaying barge or well astern of the jetbarge. The pipelaying barge, jetbarge, and attending vessels may be contacted on VHF-FM channel 16 for passage instructions.

(45) **Fish havens,** some marked by private buoys, are numerous along the Pacific coast. Navigators should be cautious about passing over fish havens or anchoring in their vicinity.

(46) **Kelp** grows on nearly every danger with a rocky bottom and is particularly heavy at various points in Santa Barbara Channel and in the vicinity of San Diego Bay. It will be seen on the surface of the water during the summer and autumn; during the winter and spring it is not always to be seen, especially where it is exposed to a heavy sea. Many rocks are not marked by kelp, because a heavy sea will occasionally tear it away and a moderate current will draw it under water so that it will not be seen. When passing on the side of a kelp patch from which the stems stream away with the current, care should be taken to give it a good berth. Dead, detached kelp floats on the water curled in masses, while live kelp, attached to rocks, streams away level with the surface. Live kelp is usually an indication of depths less than 10 fathoms.

(47) **Logs and deadheads.**–Mariners are cautioned that a large number of logs and deadheads are adrift in the navigable water of Washington and Oregon at all times, particularly after storms, spring freshets, and unusually high tide. Mariners are urged to be alert for the presence of such logs and deadheads, as they constitute a serious menace to craft of small and moderate size.

(48) **River entrances.**–Along the Oregon and Washington coast, bars build up at the mouths of the many rivers and streams that empty into the Pacific Ocean. The tidal currents at these entrances can obtain considerable velocity, especially when the ebb tide is reinforced by the river runoff. The most dangerous condition prevails when a swift ebb current meets the heavy seas rolling in from the Pacific at the shallow river entrances. The water piles up and breaks and creates a bar condition too rough for small craft. In a bar area, sea conditions can change rapidly and without warning. Always cross it with caution.

(49) **Regulated Boating Areas.**–The U.S. Coast Guard has provided for the termination of the use of boats during especially hazardous conditions on certain river bars and coastal inlets along the Pacific coastline of Oregon and Washington. The hazardous bar areas are depicted in the Coast Guard “Bar Guides” or in a pamphlet entitled “Boating in Coastal Waters,” published by the Oregon Marine Board. It is important for the small-craft operator to know when he is operating in the general vicinity of a regulated boating area, and be prepared for any changing tidal or sea conditions which may be hazardous to his vessel.

(50) **Danger zones** and **Restricted areas** are along the Pacific coast, around the Channel Islands, in the Straits of Juan de Fuca and Georgia, and in Puget Sound. (See **334**, chapter 2, for limits and regulations.)

(51) **Caution.**–Heavy concentrations of fishing gear may be expected off Drakes Bay, Grays Harbor, Columbia River, Coos Bay, Humboldt Bay and Destruction Island between December 1 and August 15, from shore to about 30 fathoms.

(52) To reduce the destruction of fishing gear by vessels and to reduce the fouling of propellers and shafts by fishing gear, the Oregon State University Extension Service has coordinated an agreement between towboaters and pot fishermen (crab and black cod) for the establishment of towboat lanes along the Pacific Coast between Half Moon Bay, California and Destruction Island, Washington. Copies of the agreement showing fishing areas and towboat lanes may be obtained from the Oregon State University Extension Service, Corvallis, Oreg. 97331.

(53) **Tides.**–A very important characteristic of the tides along the W coast of the United States is the large inequality in the heights of the two high waters and of the two low waters of each day. On the outer coast the average difference between the heights of the two high waters of the day is from 1 to 2 feet, and the average difference in the heights of the two low waters from 2 to 3 feet. It was because of this large difference in the low-water heights that the mean of the lower low waters, rather than the mean of all low waters, was adopted as the plane of reference for the charts of this region.

(54) This inequality changes with the declination of the Moon. When the Moon is near the Equator the inequality is relatively small; but when the Moon is near its greatest N or S declination, the difference in the heights of the two high waters or of the two low waters of each day reaches a maximum. The tides at this time are called **Tropic tides.**

(55) Off the outer coast, the mean rise of the tide varies from 5 feet off southern California to about 7.5 feet off the coast of Washington. Extreme variations from 3 feet below to 10 feet above the datum may reasonably be expected.

(56) At the entrance to San Francisco Bay the mean rise of the tide is about 5 feet. At the S end of the bay the tide occurs about 1½ hours later, and the mean rise is about 2.5 feet greater than at the entrance of the bay. Passing N into San Pablo Bay, the tide occurs from 1 to 2 hours later than at the Golden Gate, with a mean rise of about 0.5 foot greater than at the latter place. In Suisun Bay the time of tide is about 3 hours later than at the Golden Gate, with a mean rise about the same. It requires about 4 hours for high water to pass from Suisun Bay to Stockton, on the San Joaquin River, and about 5 hours from Suisun Bay to Sacramento, on the Sacramento River. The mean rise of the tide at Stockton is 3.6 feet, and at Sacramento is 2.6 feet.

(57) In Humboldt Bay the tide is from ½ to 1 hour later than on the outer coast. The mean rise is about 6 feet.

(58) In Coos Bay the tide is from ½ to 1½ hours later, and the rise of high water about same as in Humboldt Bay.

(59) In Yaquina Bay the mean rise is about 7 feet.

(60) At the entrance to Columbia River the mean rise is about 7 feet. It requires about 6 hours for high water to pass from the entrance to the Columbia River to the mouth of the Willamette River. In passing up the Columbia River the range of tide decreases until it is only 1.4 feet at the mouth of the Willamette. Above this point the tidal range becomes too small to be of practical importance. There are, however, large fluctuations in the level

due to meteorological conditions. An extreme variation of 24.5 feet has been noted at St. Johns on the Willamette River. Columbia River is usually highest during May, June, and July, and lowest during September, October, and November.

(61) In Willapa Bay and in Grays Harbor the mean rise is about 9 feet.

(62) Passing through the Strait of Juan de Fuca, the tide occurs about 3 hours and 40 minutes later at Port Townsend than at Cape Flattery. The mean rise increases from 7.2 feet above the datum at Cape Flattery to 7.9 feet at Port Townsend. There is an increase in the average inequality between the two low waters of each day from 3 feet at Cape Flattery to 5 feet at Port Townsend. The average inequality between the two high waters of each day at both places is about 1.5 feet.

(63) In Puget Sound the tide is about ½ to 1 hour later than at Port Townsend. The mean rise increases from 7.5 feet at Port Townsend to 13.5 feet at Olympia. In Puget Sound the average difference between the two low waters of each day is 6 feet. At Seattle an extreme range from 4.5 feet below the datum of mean lower low water to 15 feet above the same datum has been observed. At Olympia, in the S part of the sound, an extreme high water 18 feet above the datum has been noted.

(64) In the San Juan Islands, the mean rise of the tide varies from 6.5 to 8 feet. An extreme range from 4.5 feet below to 12 feet above the same datum may reasonably be expected.

(65) **Caution.**–In using the Tide Tables, high or low water should not be confused with slack water. For ocean stations there is usually little difference between the time of high or low water and the beginning of ebb or flood currents; but for places in narrow channels, landlocked harbors, or on tidal rivers the time of slack water may differ by several hours from the time of high or low water stand. The relation of the times of high and low water to the turning of the current depends upon a number of factors, hence no simple rule can be given. (See the Tidal Current Tables for predicted times of slack water or strength of current.)

(66) **Currents.**–A current, the outer limit of which extends offshore more than 300 miles, flows approximately parallel to the U.S. Pacific coast from latitude 50° to 30°N. The direction of the current is generally S throughout the year except as noted below. Its velocity, which averages about 0.2 knot, is greatly influenced by prevailing winds; N winds increase it, and S winds diminish it. North of latitude 45°N. the set is usually N from November through February.

(67) Along the coast during certain periods there is a weak N flow known as the **Davidson Inshore Current,** which is evident between San Diego and Point Conception from July through February and between Point Conception and Cape Flattery from November through February.

(68) Along the coast of Vancouver Island there is usually a NW flow, which as measured at Swiftsure Bank (48°32.0'N., 124°59.7'W.) has a velocity of nearly 0.5 knot at all seasons.

(69) The above statements apply to general or average conditions. The currents, particularly offshore, at a specific time depend largely upon prevailing winds, whereas alongshore and off the entrances to inland waterways they depend also upon tidal and drainage effects. (See the Tidal Current Tables for detailed information.)

(70) **Tsunamis (seismic sea waves).**–Although the coasts of California, Oregon, and Washington are not generally subject to waves of the magnitude which strike the Hawaiian Islands and other Pacific areas, widespread damage to shipping and to waterfront areas occasionally occurs. The tsunami of March 28, 1964, originating in the Gulf of Alaska, caused 16 deaths and several million dollars damage to ships and property in California, Oregon, and Washington. The loss of life and property can be lessened if shipmasters and others acquaint themselves with the behavior of these waves so that intelligent action can be taken when they become imminent. (See chapter 1 for details about these waves.)

(71) The Warning System operated by the National Oceanic and Atmospheric Administration and described in chapter 14 supplies warnings to the Civil Defense authorities in California, Oregon, and Washington who are responsible for disseminating this information to the affected areas. The warnings are also broadcast by the National Weather Service on NOAA Weather Radio.

(72) When a warning is received, persons should vacate waterfront areas and seek high ground. The safest procedure for ships will depend on the amount of time available, and this may not always be known. A ship well out at sea would ride such waves safely, and hence if time is available to put to sea, that would be the safest action. On the other hand, the crew of a ship in harbor may have a difficult time averting serious damage. The ship may be washed ashore by incoming waves or grounded because of excessive withdrawal of water between crests. Much of the damage in the Los Angeles area during the 1960 Chilean tsunami was caused by rapid currents and the swift rise and fall of the water level that parted mooring lines and set floating docks and ships adrift.

(73) **Weather, West Coast and Hawaii.**–This section presents an overall, seasonal picture of the weather that can be expected in the offshore waters along the entire west coast of the United States as well as coastal and near-coastal sites and the Hawaiian and Pacific Islands. Detailed information, particularly concerning navigational weather hazards, can be found in the weather articles in the following chapters.

(74) All weather articles in this volume are the product of the **National Oceanographic Data Center (NODC)** and the **National Climatic Data Center (NCDC).** The meteorological and climatological tables are the product of the NCDC. Both centers are entities of the **National Environmental Satellite, Data, and Information Service (NESDIS)** of the **National Oceanic and Atmospheric Administration (NOAA)**. If further information is needed in relation to the content of the weather articles, meteorological tables or climatological tables, contact the National Climatic Data Center, Attn: Customer Service Division, Federal Building, 151 Patton Avenue, Room 120, Asheville, NC 28801-5001. You may also contact the CSD at 704-271-4994, or fax your request to 704-271-4876.

(75) Climatological tables for coastal locations, meteorological tables for the coastal ocean areas, and a table of mean surface water temperatures and densities relevant to locations discussed within this volume, follow the appendix. The climatological tables are a special extraction from the International Station Meteorological Climate Summary. The ISMCS is a CD-ROM jointly produced by the National Climatic Data Center, Fleet Numerical Meteorology and Oceanography Detachment-Asheville, and the U.S. Air Force Environmental Technical Applications Center, Operating Location–A. The meteorological tables for the ocean areas are compiled from observations made by ships in passage and extracted from the National Climatic Data Center's Tape

Deck-1129, Surface Marine Observations. Listed in the appendix are National Weather Service offices and radio stations which transmit weather information.

(76) **Marine Weather Services Charts** published by the National Weather Service show radio stations that transmit marine weather broadcasts and additional information of interest to mariners. These charts are for sale by the National Ocean Service Distribution Division (N/ACC3). (See appendix for address.)

(77) The Pacific coastal region of the United States and the adjacent ocean areas are located along the east portion of the Pacific high-pressure system. This high, when well developed, forms the principal circulation control forcing most of the low-pressure systems to follow a course to the north of the contiguous United States. This is reflected in the presence of the Aleutian low in the Gulf of Alaska. This action damps out weather changes that might otherwise occur and brings a stability factor that would not otherwise exist. Air which reaches the coast as a result of the prevailing westerly winds has acquired much moisture during its ocean passage, resulting in high humidities along the coast. The marine influence is also evidenced in a cooling effect in summer and a warming influence in winter.

(78) Two features of the climate in these waters, while not commonplace, warrant the mariner's attention because of their severity. One is the tropical cyclones and the other a local wind known as the Santa Ana.

(79) **Tropical cyclones** originate south of the area, off the west Mexican coast, in summer and autumn. About 15 form each season, of which eight reach hurricane intensity. Few come far enough north to affect U.S. coastal waters. The ones that do have usually lost their hurricane intensity and are short-lived. However, these storms can be dangerous and have generated winds of more than 120 knots. Further reference is made to tropical cyclones in the seasonal description.

(80) The **Santa Ana** is an offshore desert wind that occurs in or near San Pedro Bay. While infrequent, it may be violent; speeds have been measured at more than 50 knots. These winds diminish little, if any, immediately after passing over water, and can extend up to 50 miles (93 km) out to sea. They are most likely in late autumn or winter. (See Weather articles, chapter 4, for more details.)

(81) A third feature, the **El Nino/Southern Oscillation (ENSO)**, sporadically influences these waters. **ENSO** is a two-phased weather phenomenon with roots in the equatorial Pacific and coastal South America; El Nino is the warm water phase and **La Nina**, the cool water phase.

(82) El Nino is an abnormally warm, eastward-moving, Equatorial Pacific current which is thought to have a pronounced influence on the global atmospheric circulations. It is known that during an El Nino event, the normal southeast trade winds of the near Equatorial Pacific region break down allowing for near-global-wide altered weather patterns. During a strong El Nino, this typically means an unusually strong subtropical jet stream that brings storms from central and southern California eastward through the gulf coast and southeast states. If the El Nino is weaker, drought to California and rains to the gulf coast and southeast states may be expected.

(83) Following an El Nino event, the near-equatorial trade winds return to normal. On occasion, the southeast trade winds become stronger than normal. If this occurs, a La Nina is present, the opposite of El Nino. It is believed that a strong La Nina leads to drought across much of North America.

(84) Winter, like an incoming tide, creeps over the northeastern North Pacific. Subtle changes begin in September. Seas off central and southern California come under the protection of a weak, good-weather subtropical high centered near 35°N and 145°W. Only enough storms penetrate this protective barrier to make winter a distinguishable season off southern California. This same high pressure system in conjunction with a strengthening Aleutian Low, bodes differently for points further north. Summer breezes become gales. Rain is commonplace. Winds and cool temperatures make the air feel damp and chilly. Storms become routine and onshore flow is near-persistent. Choppy seas turn rough.

(85) Winter storms usually work their way from the central Pacific northward into the Gulf of Alaska or to the coast of British Columbia, trailing their frontal systems across the area. Two or three times a month, on an average, a storm will move directly through the seas off the Washington-Oregon coast. The more seaward storms generate the moderate to strong southeast through west winds that prevail over northern waters and influence the weather as far south as central California. The stronger winds that blow over a long fetch of water whip up rough seas. Seas of 12 feet (3.7 m) or more are generated 15 to 20 percent of the time. In addition, the warm south flow brings cloudiness, drizzle, and sometimes fog. Drizzle occurs about 5 to 8 percent of the time, and there are about 2 to 4 days a month when dense fog reduces visibilities to 0.5 mile (0.9 km) or less at sea. These conditions can persist for a week or more if one of these big storms stalls in the Gulf of Alaska. The south flow is also responsible for air temperatures in the upper forties and fifties (8.9° to 15°C). Cold temperatures are unusual and are most likely when cold Arctic air is fed into a low in the Gulf by a large high in the Bering Sea or when a rare outbreak of Arctic air occurs over the area from the north or northeast. Temperatures at these times may drop below freezing (<0°C) off the Washington coast and into the upper thirties (3.3° to 3.9°C) farther south. The infrequency of cold temperatures lessens the chances for snow, which is observed less than 2 percent of the time off Washington and less than 1 percent of the time off Oregon.

(86) When a storm moves close or through these northern waters, weather changes rapidly. The center is preceded by a strong southeast to southwest flow that may reach gale force (gales occur on about 3 to 5 days per winter month) and may whip seas up to 20 feet (6.1 m) or more; seas of these heights occur up to 4 percent of the time. These conditions are often accompanied by clouds and rain, with temperatures in the fifties (10° to 15°C). After the center passes, winds will veer to the west through north and remain strong for a while. Brief showers soon end, the clouds break, and temperatures drop into the low forties (5° to 6.7°C). A high-pressure system from the central Pacific may follow and bring a brief period of clear conditions. If a storm stalls or it is followed by a series of storms, bad weather can be prolonged for a week or more. Rain falls on 18 to 28 days per winter month in these north waters, and skies are overcast or obscured 40 to 50 percent of the time.

(87) About once or twice a month, a storm moves into northern California offshore waters. While these lows are often weaker than those farther north, some cause gales and rough seas. Gales blow on 4 to 5 days per month, and seas reach 12 feet (3.7 m) or more about 8 to 16 percent of the time. These conditions can also be generated by the interaction of a low to the north and a high to the south. The south winds can raise temperatures into the sixties

(16.1° to 20.6°C) off northern and central California. Clouds and rain accompany these systems. Rain falls on about 10 to 15 days per month.

(88) Off northern and central California, storms bring a preponderance of southeast through southwest winds, but this is matched by northwest and north winds that blow around the subtropical highs. These highs either form in the Pacific or migrate from Asia. They dominate the weather off the southern California coast, where west through north winds blow more than 60 percent of the time. However, these highs are weakest during winter, and occasionally storms move close enough to bring some clouds, rain, and wind. Rain occurs on about 5 to 10 days per month off central and southern California. Gales and rough seas are rare south of Los Angeles. Between Los Angeles and San Francisco, gales blow on about 1 to 4 days per month, while seas of 12 feet (3.7 m) or more occur about 4 to 8 percent of the time.

(89) Fog is a problem in the offshore waters between Los Angeles and San Francisco. Visibilities less than 2 miles (4 km) occur 5 to 7 percent of the time, while dense fog reduces visibilities to less than 0.5 mile (0.9 km) on 2 to 5 days per month.

(90) Spring brings change. March is an epilogue to winter, while May provides a prologue to summer. Cold rainy days alternate with mild sunny ones. The gradual changeover takes place under the forceful prodding of the expanding good-weather Pacific high. In March the center approximates 30°N and 140°W. As the high expands, it forces the increasingly weak and infrequent storms north into the western Gulf of Alaska and Bering Sea. Since the high is not yet a permanent feature, storms will occasionally penetrate the area, particularly in early spring, when they sometimes move into the Pacific northwest or even across the northern California coast. Southern California waters remain protected by the high. This expanding high-pressure system, which brings good weather, creates a problem in the offshore waters of central and northern California. It causes a tightening of the pressure gradient, which increases wind strength. In other areas, winds and waves are becoming less of a problem. A change is taking place in the direction of prevailing winds. Off southern California, prevailing northwest and north winds are becoming increasingly persistent. With the expansion of the high, north and northwest winds are becoming the prevailing directions throughout the area. This is a slow change. In March, south and north winds share equal billing.

(91) Storms to the W and NW of the Washington-Oregon offshore waters, while not as frequent as in winter, still generate SE to W winds as they work their way N. The prevailing storm track is shifting northward so not as many lows move directly through the area, and they are often less intense. Gales from these near and distant storms blow on about 2 days in March, and they are rare by May. Seas also calm down. In March, waves of 12 feet (3.7 m) or more occur 15 to 20 percent of the time; this drops to 10 percent by April and to around 5 percent by May. The general south flow from these storms still bring rain, drizzle, and fog. Rain or drizzle can be expected on about 15 to 18 days in March and 9 to 15 days in May. Dense fog (visibilities less than 0.5 mile (0.9 km)) forms on less than 2 days per month, while visibilities drop below 2 miles (4 km), 2 to 4 percent of the time. Because of the clouds and rain associated with this S flow, it is not always responsible for the warmest spring temperatures. Usually, it is accompanied by temperatures in the forties and low fifties (5° to 11.1°C) in March and 50°F (10°C) readings during May. An occasional cold N outbreak, usually following a storm, can drop March temperatures into the mid- to upper thirties (0.6° to 3.9°C).

(92) Occasionally a low will move close enough to bring some clouds, rain, and drizzle; distant lows often account for some of the cloudy days. This is more likely in early spring, when rain falls on about 4 to 5 days in the S, and 5 to 15 days in central and Northern waters. By May, storms are less frequent, and rain occurs on just 1 or 2 days S of Los Angeles and 3 to 10 days to the N.

(93) Fog is a problem in the offshore waters between Los Angeles and San Francisco. In April and May, visibilities drop below 2 miles(4 km) 8 percent of the time, and fog reduces visibilities to less than 0.5 mile (0.9 km) on about 2 to 3 days per month. It occurs mostly with winds from the SW through NW, when they bring warm air over the cooler waters.

(94) Two important features are responsible for the summer weather in these offshore waters, the subtropical Pacific high and the cold California Current.

(95) The influence of high-pressure systems becomes increasingly frequent in these northern waters during spring. In fact, a principal path of highs from the central and western Pacific runs through this area and onto the Washington-Oregon coast. These systems bring clearing conditions, W through N winds, and sometime mild temperatures. Temperatures can, on occasion, get up into the upper fifties and low sixties (14.4° to 16.7°C) in March and into the upper sixties (19.4° to 20.0°C) in May. Clear to partly cloudy skies occur most often with W to N winds. Wind speeds are less than 10 knots most often with W to N winds.

(96) High-pressure systems dominate the weather in California offshore waters, although an occasional storm disrupts the good weather, particularly in early spring. Wind and sea conditions are not so good, however, in waters from off San Francisco northward. In this region, the pressure gradient between highs and lows is often very tight, creating strong N winds which blow at speeds that average near 20 knots and whip up seas of 12 feet (3.7 m) or more from 8 to 20 percent of the time. This situation continues throughout spring.

(97) Conditions improve rapidly toward the S, where winds are lighter and seas calmer. The high-pressure systems are responsible for W through N winds, clear skies, and cool temperatures. Winds become increasingly persistent during spring, as the highs become more frequent. By May, NW through N winds are blowing close to 70 percent of the time N of San Francisco, and W through NW, about the same to the S. These winds blow over cold water and help keep temperatures in the fifties (10.6° to 15.0°C) throughout the spring, N of San Francisco. Even to the S, temperatures in the fifties (10.6° to 15°C) in March only climb into the mid-fifties to mid-sixties (11.7° to 19.4°C) by May. This compares with temperatures in the 70° to 80° (21.1° to 26.7°C) range at the same latitudes in North Atlantic offshore waters, where the Gulf Stream helps warm the air. The high-pressure systems are also responsible for the clear skies (about one-quarter cloud cover) that occur 25 to 50 percent of the time in these offshore California waters.

(98) The high is made up of high-pressure systems, which either form in the Eastern Pacific or move into the area from Western Pacific waters, the Bering Sea, or the Gulf of Alaska. By July the mean center of the Pacific High is located around 40°N and 150°W. The S flowing California Current is partially driven by the clockwise circulation of these high-pressure systems.

Upwelling also contributes to cool water temperatures. Sea-surface temperatures run 10° to 15°F (-12.2° to -9.4°C) cooler than they do off the Atlantic coast. Its influence is so great that average air temperatures off Eureka never get out of the fifties (10.6° to 15.0°C), and extremes have only reached 87°F (30.6°C), just 9°F (-12.8°C) warmer than the January extreme. The California Current and coastal upwelling are responsible for the poor visibilities of summer and fall. The most dense and frequent fog occurs over the narrow stream of coldest water, just off the coast, and is often limited to a band of 50 miles (81 km) or less. At other times, fog covers large areas, both in latitude and longitude, and may extend for hundreds of miles (>161 km). Its effect is even more pronounced onshore, as you can read in the Weather articles in the chapters following. The effect of the California Current in summer extends along the entire coast.

(99) When a high sits to the W, which is most of the time in summer, W through N winds blow over the offshore waters. Between Point Arguello and Portland, this warm moist air is being chilled by the California Current. This results in not only cool temperatures but low clouds and fog. W through N winds blow 70 to 80 percent of the time. In the offshore waters, where merchant ships are trying to avoid poor visibilities, fog and haze are still encountered 30 to 40 percent of the time between Point Arguello and San Francisco. The fog reduces visibilities to below 0.5 mile (0.9 KM) up to 5 days per month. Skies are obscured by fog, or are overcast, up to 50 percent of the time in these offshore waters. Temperatures are often in the midfifties to midsixties (11.7° to 19.4°C) at these times.

(100) Between San Francisco and Portland, fog and haze occur 15 to 25 percent of the time. Fog reduces visibilities to below 0.5 mile (0.9 km) on about 3 to 8 days per month. Skies are obscured or overcast about 30 to 40 percent of the time. In addition to fog, this offshore area is often plagued by gales and rough seas created by a tight pressure gradient between a high off the coast and a heat low over the southwestern United States and Mexico. Gales blow on about 4 to 6 days per month. Strong winds whip up seas of 12 to 20 feet (3.7 to 6.1 m) about 3 to 10 percent of the time.

(101) As storms become less frequent during summer, so does rain. By August, rain falls 3 to 7 percent of the time in the offshore waters from Point Arguello to Vancouver Island.

(102) In the offshore waters between Portland and Vancouver Island, W and NW winds blow more than one-half of the time, skies are clear 20 to 30 percent of the time, and temperatures are frequently in the sixties (16.1°to 20.6°C). Gales are rare; and, while it rains 5 to 10 percent of the time, this a lot less frequent than during any other season. W through N winds often bring poor visibilities to this area. Fog and haze are encountered 8 to 15 percent of the time. Fog drops visibilities below 0.5 mile (0.9 km) on about 2 to 5 days per month and is most frequent from midsummer on.

(103) South of Point Arguello, weather is fair. Visibilities are usually better than 5 miles, winds and seas are calmer, but temperatures are cool. These offshore waters are almost always under the influence of a high. W through NW winds, which blow 70 to 75 percent of the time, keep temperatures mostly in the sixties (16.1° to 20.6°C) and bring haze and fog about 15 percent of the time. These warm, moist winds blowing over the California Current also help keep the sky overcast or obscured almost one-half of the time. Skies are clear about one-quarter of the time. Gales are rare, as are rough seas. Winds blow at about 10 knots.

(104) The subtropical high-pressure system forces most tropical storms S of southern California. There is a threat of tropical cyclones from June through November. An average tropical cyclone season sees about 15 tropical cyclones (winds of about 34 knots), of which an average of 8 reach hurricane strength. These storms seldom move N of 30°N. They are most likely to reach the latitudes of 30° to 35°N in August or September. However, by this time, they are usually weak and either well out to sea or well inland over Arizona. The eastern North Pacific season peaks in July, August, and September. About three to five tropical cyclones can be expected each month, with an average of one to two reaching hurricane strength. The last damaging tropical cyclone to affect southern California was the September 1939 storm which moved inland near Los Angeles. In September 1972, the remains of a hurricane moved inland between San Diego and Los Angeles; it carried only 20-knot winds at the time of landfall. Several other tropical storms have completed the decaying process in the California coastal waters near the Channel Islands.

(105) Fall arrives subtly in September N of Point Arguello. It is delayed a month or so to the S by the subtropical high. High-pressure systems still bring some sunny, mild days with light west through N winds off Oregon and Washington, but even on these days, swells from distant storms often cast an ominous mood over these waters. Some storms move close enough to generate a SE through SW flow off Oregon and Washington. They also bring rain to offshore Washington waters about 8 to 13 percent of the time. A tightening of pressure gradients, off northern California and Oregon in September, is responsible for gales on 2 to 5 days, and for seas of 12 feet (3.7 m) or more, 2 to 4 percent of the time. Meanwhile, off central California, gales blow less often and seas are calmer than they were last month. September is usually the driest month in offshore waters from Oregon southward. Precipitation frequencies range from 6 percent off Oregon to less than 1 percent off southern California. Poor visibilities continue to plague the offshore waters N of Point Arguello. Fog reduces visibilities to less than 0.5 mile (0.9 km) on about 4 to 6 days in September. September temperatures usually range from the upper fifties and low sixties (14.4° to 16.7°C) in the N, to the mid- and upper sixties (18.3° to 20.6°C) off southern California.

(106) During October and particularly November, storms become more frequent, more intense, and move closer to the area than those of summer and early autumn. As the subtropical high weakens and retreats southward and the Aleutian Low is at its deepest, these storms move to the NW and N, most affecting the vulnerable waters off Washington and Oregon. They frequently sweep these seas with strong SE through SW winds, which carry rain and sometimes fog. These winds average 15 to 20 knots. Gales occur on about 2 to 4 days in October and 3 to 6 days in November, off Washington and Oregon. Strong winds whip up seas of 12 feet (3.7 m) or more about 10 to 16 percent of the time. Rain falls more often as autumn progresses. It occurs about 8 to 20 percent of the time in October, increasing to 16 to 30 percent by November in these N seas. This is about as much as it rains in any month. Fog continues to plague this area, and often rides in on a strong, warm S flow that accompanies a low-pressure system. It reduces visibilities to below 0.5 mile (0.9 km) on about 2 to 5 days per month. Temperatures of Washington and Oregon are often in the fifties (10.6° to 15°C) in October and mid-forties to mid-fifties (8.9° to 13.9°C) the following month.

(107) The winter transition comes later to California offshore waters. High-pressure systems remain influential, so winds often

blow out of the N and NW through late autumn, particularly in the S. Even off northern California, winds out of the N are only slightly less frequent than southerlies as late as November. Storms move closer and occasionally break through the protective barrier in November. In offshore northern California waters, they are responsible for about 3 to 5 gale days per month, and for seas of 12 feet (3.7 m) or more, 6 to 10 percent of the time. They also dump rain up to 10 percent of the time. Weather generally improves to the S, where rain falls as little as 3 percent of the time. Gales occur on about 2 days or less. Seas of 12 feet (3.7 m) or more occur about 8 percent of the time in central waters, and about 1 percent in the S. Temperatures change slowly over offshore waters. In October, they frequently run in the fifties (10.6° to 15.0°C) in the N, and in the sixties (16.1° to 20.6°C) to the S. Temperatures drop just a few degrees in November.

(108) Fog continues to be the most frequent navigational weather hazards in the waters of offshore northern and central California. Fog reduces visibilities to below 0.5 mile (0.9 km) on about 5 to 7 days during October, the worst month. Fog and haze are reported about 15 to 20 percent of the time, except off Los Angeles, where they occur about 40 percent of the time.

(109) **Routes.**–The route along the California-Oregon-Washington coast frequently must be navigated in thick weather. Most of the courses are long, and the effect of currents is uncertain.

(110) **San Diego to Strait of Juan de Fuca.**–Vessels can proceed on rhumb lines through the following positions:

(111) 32°37'N., 117°16'W.; off San Diego.

(112) Thence to the Traffic Separation Scheme off San Pedro Bay, then follow the Traffic Separation Scheme between Point Fermin and Point Conception.

(113) 34°33'N., 120°42'W.; off Point Arguello.

(114) 37°38'N., 123°12'W.; off Farallon Islands (San Francisco).

(115) 38°55'N., 123°50'W.; off Point Arena.

(116) 40°26'N., 124°32'W.; off Blunts Reef.

(117) 42°50'N., 124°44'W.; off Cape Blanco.

(118) 46°11'N., 124°12'W.; off Columbia River.

(119) 48°10'N., 124°52'W.; off Umatilla Reef.

(120) 48°26'N., 124°47'W.; off Cape Flattery.

(121) **Caution:** Route W of Farallon Islands crosses San Francisco-Honolulu and other Pacific courses of vessels using the San Francisco Traffic Separation Scheme.

(122) **San Diego to San Francisco.**–Vessels can follow San Diego-Strait of Juan de Fuca route to position off Point Arguello, thence rhumb lines through the following positions:

(123) 36°17'N., 121°57'W.; off Point Sur.

(124) 37°10'N., 122°26'W.; off Pigeon Point.

(125) Thence by prescribed San Francisco Traffic Separation Scheme route to vicinity of San Francisco Approach Lighted Horn Buoy SF.

(126) **San Francisco to Strait of Juan de Fuca.**–Follow prescribed San Francisco Traffic Separation Scheme route to a position off Point Reyes, thence to Point Arena and other positions on the San Diego-Strait of Juan de Fuca route.

(127) **Caution.**–Strict adherence to tracks through positions listed above could result in collision of meeting vessels. It is suggested that southbound vessels shape courses through positions 1 mile farther off the mainland.

(128) **San Diego to Panama.**–Proceed on rhumb lines through the following positions:

(129) 32°38'N., 117°13'W.

(130) 28°00'N., 116°00'W.

(131) 24°40'N., 112°30'W.

(132) 20°00'N., 107°30'W.

(133) 07°05'N., 81°45'W.

(134) **San Diego to Honolulu.**–Rhumb line from 32°37'N., 117°16'W., to 21°14'N., 157°39'W.

(135) **Los Angeles to Honolulu.**–Follow the Traffic Separation Scheme route through the Gulf of Santa Catalina, thence proceed on rhumb lines through the following positions:

(136) 32°48'N., 118°16'W.

(137) 21°14'N., 157°39'W.

(138) **San Francisco to Honolulu.**–Follow prescribed San Francisco Traffic Separation Scheme route to a position S of Farallon Islands, thence rhumb line to

(139) 21°14'N., 157°39'W.

(140) **Strait of Juan de Fuca to Honolulu.**–Great circle from

(141) 48°26'N., 124°47'W., to

(142) 21°14'N., 157°39'W.

(143) **Strait of Juan de Fuca to Unimak Pass.**–Great circle from

(144) 48°31'N., 125°00'W., to

(145) 54°00'N., 163°00'W.; thence on rhumb line to

(146) 54°20'N., 164°45'W.

(147) **Principal ports.**–The principal deep-draft commercial ports within the area of this Coast Pilot are: San Diego, Long Beach, Los Angeles, San Francisco, Oakland, Richmond, Stockton, Humboldt Bay, Coos Bay, Portland, Vancouver, Grays Harbor, Seattle, Tacoma, and Honolulu.

(148) Other ports are Port Hueneme, Port San Luis, Redwood City, Sacramento, Astoria, Longview, Port Angeles, Anacortes, Bellingham, Olympia, and Hilo.

(149) **Pilotage, general.**–In the area covered by this Coast Pilot, pilotage, with a few exceptions, is compulsory for all foreign vessels and for U.S. vessels under register in the foreign trade. It is optional for U.S. vessels in the coastwise trade, provided they are under the control and direction of a pilot duly licensed by Federal law for the waters which that vessel travels.

(150) Only at San Francisco do pilot boats cruise on station continuously. At the other ports the pilots must be notified in advance in order for the pilot boat to meet the vessel at the proper time. Most of the pilot boats and stations may be contacted by radio; though ships' agents normally arrange for pilots, a vessel may notify the pilot station of its estimated time of arrival by radio. Specific information is given in the description of the various ports.

(151) **Towage.**–Tugs of various sizes are available at all the deep-draft ports. Arrangements for their use are usually made by the ship's agent, but in some cases may be made from the vessel by radio. For further information, refer to the description of the port.

(152) **Vessel Arrival Inspections.**–Quarantine, customs, immigration, and agricultural quarantine officials are stationed in most major U.S. ports. (See appendix for addresses.) Vessels subject to such inspections generally make arrangements in advance through ships' agents. Unless otherwise directed, officials usually board vessels at their berths.

(153) **Harbormasters and wharfingers** are mentioned in the text when applicable. They generally have charge of the anchorage and berthing of vessels.

(154) **Supplies** of all kinds are available at San Diego, Los Angeles, Long Beach, San Francisco Bay, Portland, Seattle, and Tacoma. Limited quantities can be obtained at many other ports.

(155) **Repairs.**–Large ocean-going vessels may be drydocked for complete repairs at Los Angeles, Long Beach, San Francisco Bay, Portland, and Seattle. Smaller ships of up to about 7,000 tons may also be drydocked at San Diego. Fishing boats and yachts can be hauled out and can have hulls and engines repaired at numerous other places. The Coast Pilot gives information on many of these facilities; usually the largest repair facility in each area is mentioned. Additional information may be obtained from the series of small-craft charts published for many places.

(156) **Salvage** equipment is available at Los Angeles, San Francisco Bay, Portland, and Seattle.

(157) **Small-craft facilities.**–There are numerous places where fuel, supplies, protected berths, repairs, and shore facilities are available for small craft. For isolated places and small cities, the Coast Pilot describes the more important of these facilities; for large port areas, where individual facilities are too numerous to mention, the information given is more general. Additional information may be obtained from the series of small-craft charts published for the many places, and from various local small-craft guides.

(158) **A vessel of less than 65.6 feet (20 meters) in length or a sailing vessel shall not impede the passage of a vessel that can safely navigate only within a narrow channel or fairway. (Navigation Rules, International-Inland Rule 9(b).)**

(159) Southern California has many small-craft harbors with excellent facilities, but N of San Francisco the distances between protected harbors having facilities increases considerably until in the Puget Sound area. Temporary moorage is usually available for transients at most of the harbors. The intense yachting activity of California as far N as San Francisco, however, makes transient moorage more difficult along this section of the coast, even with its numerous harbors built especially for such craft.

(160) **Standard time.**–California, Oregon, and Washington use Pacific standard time, which is 8 hours slow of Greenwich mean time. Example: When it is 1000 at Greenwich, it is 0200 in the three coastal States. Hawaii uses Hawaii-Aleutian standard time (H.A.s.t.), which is 10 hours slow of Greenwich mean time. Example: When it is 1000 at Greenwich, it is 0000 in Hawaii.

(161) **Daylight saving time.–**In California, Oregon, and Washington, clocks are advanced 1 hour on the first Sunday in April and are set back to standard time on the last Sunday in October. Daylight saving time is not observed in the State of Hawaii.

(162) **Legal public holidays.**–The following are legal holidays in the area covered by this Coast Pilot: New Year's Day, January 1; Martin Luther King, Jr.'s Birthday, third Monday in January; Washington's Birthday, third Monday in February; Memorial Day, last Monday in May; Independence Day, July 4; Labor Day, first Monday in September; Columbus Day, second Monday in October; Veterans Day, November 11; Thanksgiving Day, fourth Thursday in November; and Christmas Day, December 25. The national holidays are observed by employees of the Federal Government and the District of Columbia, and may not be observed by all the States in every case.

(163) In addition, the following holidays are also observed in the area covered by this Coast Pilot: Lincoln's Birthday, February 12, in California and Washington, first Monday in February, in Oregon; Presidents Day, first Monday in February, in Hawaii; Kuhio Day, March 26, in Hawaii; Good Friday, in Hawaii, in California from 1200 to 1500; Kamehameha Day, June 11, in Hawaii; Admission Day, third Friday in August, in Hawaii; Admission Day, September 9, in California; General Election Day, first Tuesday after first Monday in November, in California and Washington.